

2014 Maryland FMP Report (September 2015)

Section 19. Tautog (*Tautoga onitis*)

Tautog are a long-lived, slow-growing species. They prefer nearshore coastal waters, especially rocky reef areas, but have been caught as far inland as the Maryland Chesapeake Bay Bridge. They generally move inshore in the spring and summer and offshore in the fall and winter. Although tautog are managed as a single stock from North Carolina to Massachusetts, tagging data indicate there is limited movement north and south along the coast and intermixing between regions appears to be minimal. The most recent Atlantic Marine Fisheries Commission (ASMFC) stock assessment report (2015) considered a regional approach to assessing the tautog stock.¹ As a result, ASMFC has initiated the development of a new amendment to explore the use of regional management with region-specific reference points. Maryland will be part of a proposed regional approach with Virginia and Delaware.

Fishery Management Plans (FMPs)

The Chesapeake Bay and Atlantic Coast Tautog Fishery Management Plan (FMP) was adopted in 1998 by the Chesapeake Bay Program (CBP) to perpetuate the stock and maintain existing fisheries. The CBP FMP adopts ASMFC guidelines and requirements. The CBP FMP was reviewed in 2011. The review evaluated the goals, objectives, strategies, and actions within the 1998 FMP and concluded that the current management framework is appropriate for managing the stock.

The ASMFC Fishery Management Plan for Tautog (1996) defined overfishing and established an interim fishing mortality rate (F) of 0.24, a final target $F = 0.15$, and a minimum size of 14". Addenda I (1997) and II (1999) successively extended the implementation timeframe for F_{target} . Addendum III (2002) revised the F_{target} reference point to 0.21 and a biological reference point of 40% spawning stock biomass (SSB, 0.29). Overfishing was defined as $F_{\text{threshold}} = 0.29$. Addendum IV (January 2007) established biological reference points to determine if tautog are overfished: $SSB_{\text{target}} = 59$ million lbs. and $SSB_{\text{threshold}} = 44$ million lbs. Tautog biomass was below average for 8 years and a rebuilding F_{target} of 0.20 was implemented. The addendum stipulated that only recreational regulations would be implemented to reduce F . Addendum V (April 2007) removed the provision that restricted regulations to the recreational fishery. Addendum VI (2011) required a reduction in F_{target} to 0.15: a 53% coastwide reduction in harvest. Following Technical Committee recommendations, the 53% coastwide harvest reduction was revised to 39% in early 2012.² Maryland implemented regulations in 2012 to achieve the required reduction. Maryland is required to submit an annual compliance report to ASMFC.

Stock Status

Over the years, ASMFC has conducted full and benchmark stock assessments for tautog (1995, 1999, 2002, 2005, 2011). The 2011 stock assessment update and subsequent corrections (2012) determined that tautog were below the SSB_{target} (26,800 mt or 59.1 million lbs.) and the $SSB_{\text{threshold}}$ (20,100 mt or 44.3 million lbs.). Fishing mortality (F) was estimated at 0.26, below the target ($F_{\text{target}} = 0.15$).^{3,4} The most recent stock assessment (2015) utilized data through 2013. Based on one unit stock, tautog continue to be overfished and overfishing is still occurring.¹ Tautog SSB has remained below the threshold value since 1989.¹ The 2015 stock assessment also evaluated the stock based on three regional divisions. Based on the regional assessment approach, the Southern New England stock is overfished and overfishing is occurring; the NY-NJ stock is overfished, but overfishing is not occurring; and the DelMarVa stock is overfished, but overfishing is not occurring.¹ The ASMFC Technical Committee recommended a stock assessment update in 2016 and a benchmark stock assessment in 2019.

Current Management Measures

Maryland's tautog regulations have not changed since 2013. Both commercial and recreational fisheries have a minimum size limit of 16". Fisheries in tidal and coastal waters are limited to 4 fish per person per day during January 1 – May 15 and during November 1 – 26. Harvest is reduced to 2 fish per person per day from May 16 – October 31. Tautog harvest is prohibited from November 27 – December 31. Commercial harvesters are allowed to use hook and line, net, pot, trap, trot line, and seine. One panel on pots and traps must be attached with degradable fasteners to prevent ghost fishing if lost. Recreational anglers are restricted to hook and line.

The Fisheries

Maryland's commercial and recreational tautog harvest are minor components of the total coastwide landings. Commercial landings have remained at low levels since 2007 due to the limited possession allowance (Figure 1).⁶ Maryland's tautog landings have averaged ~1% of coastwide landings.

Estimated tautog recreational total catch (includes released fish) from Maryland in 2014 was 2,545 fish. Preliminary estimate for 2015 is 15,973 fish (percent standard error = 58% and 81%, respectively).⁷ In Maryland, the majority of tautog are caught by the recreational fishery.¹

Issues/Concerns

Tautog are dependent on bottom structure, but managed as a single Atlantic coast stock. Egg and larval dispersal is believed to be coastwide. Juvenile and adult

migration is limited and would best be managed as regional stocks.⁸ Regional stocks and management options will be examined during the development of a new ASMFC amendment (2016). A DNA analysis of tautog is underway to determine if there is genetic separation in the coastal stock. Maryland is participating in this study.

Oyster reefs and submerged aquatic vegetation (SAV) are important estuarine habitats for tautog. Restoration of these habitats in Chesapeake and Coastal Bays is important, particularly for juveniles. Adult tautog are dependent on hard bottom and deep water coral habitats, found in ocean waters, whose extent are poorly documented.

Figure 1. Maryland and coastwide commercial tautog landings (lbs.): 1950-2012. No reported landings for 2013 or 2014 from NMFS database⁶ Discrepancies between commercial landings reported NMFS, ACCSP, and MD DNR are due to differences in data confidentiality requirements.

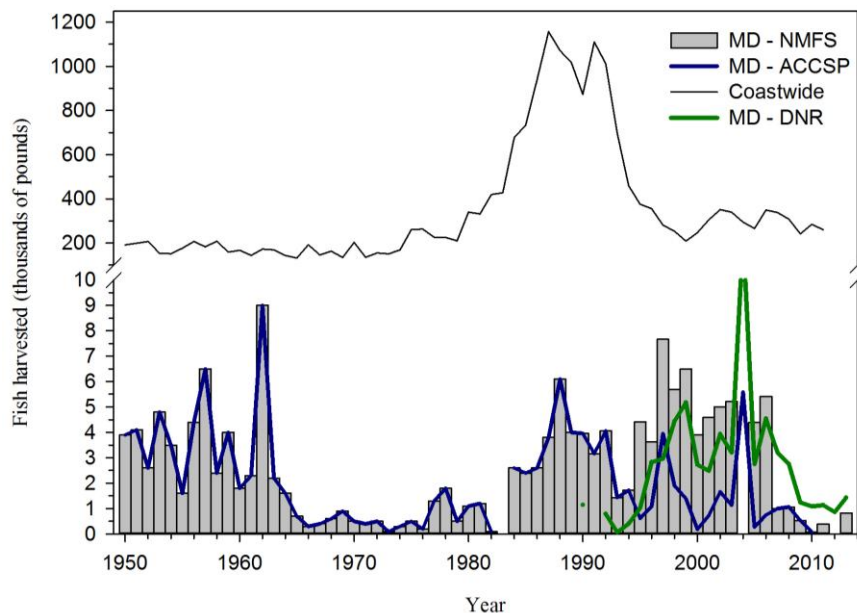
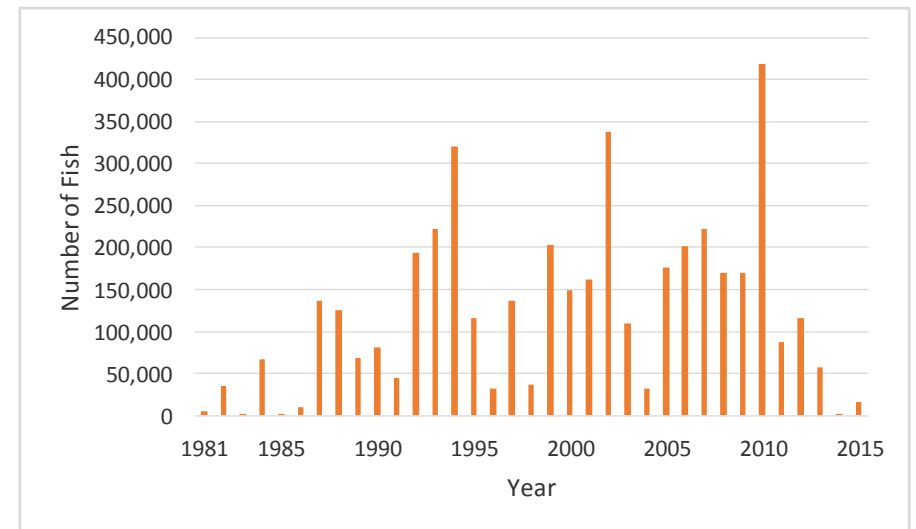


Figure 2. Estimated tautog recreational total catch from Maryland (number of fish): 1981-2015 (2015 preliminary).⁷



References

- ¹ Atlantic States Marine Fisheries Commission. 2015. Tautog Benchmark Stock Assessment and Peer Review Reports. Arlington, Virginia
- ² Atlantic States Marine Fisheries Commission. 2015. Review of the Atlantic states marine fisheries commission fishery management plan for tautog (*Tautoga onitis*): Fishing year 2013. Atlantic States Marine Fisheries Commission. Arlington, Virginia.
- ³ Atlantic States Marine Fisheries Commission. 2011. Addendum VI to the interstate fishery management plan for tautog. Atlantic States Marine Fisheries Commission. Arlington, Virginia.

- ⁴ Atlantic States Marine Fisheries Commission. 2011. 2011 Tautog Assessment Update Summary. Atlantic States Marine Fisheries Commission. Arlington, Virginia.
- ⁵ Maryland Department of Natural Resources. 2015. Maryland's 2014 tautog (*Tautoga onitis*) compliance report to the Atlantic States Marine Fisheries Commission. Maryland Department of Natural Resources, Fisheries Service. Annapolis, Maryland.
- ⁶ Personal communication from the National Marine Fisheries Service, Fisheries Statistics Division. Commercial landings statistics <http://www.st.nmfs.noaa.gov/>
- ⁷ Personal communication from the National Marine Fisheries Service, Fisheries Statistics Division. Recreational landings statistics.
- ⁸ Tuckey, T., N. Yochum, J. Hoenig, J. Lucy, and J. Cimino. 2007. Evaluating localized vs. large-scale management: The example of tautog in Virginia. *Fisheries* 32(1): 21–28.

1998 Chesapeake and Atlantic Coast Tautog Fishery Management Plan Implementation Table (updated 9/2015)			
Strategy	Action	Date	Comments
1) Implement minimum size and possession limits applicable to the commercial and recreational fisheries to prevent overexploitation. Monitor size composition of landings in the recreational fishery to prevent compression of age structure in the population. Use size composition of fish in the recreational fishery and total landings in the commercial fishery as triggers to implement further management of the fishery, should statistically significant compression of the age structure occur. This plan recommends that the Secretary of Commerce implement minimum size and possession regulations for tautog in the EEZ that are in accordance with state minimum size requirements contained in the plan. It is the intention under the Atlantic Coastal Fisheries Conservation and Management Act to have EEZ fisheries regulated consistent with state possession and landing laws, and that the more stringent of state or federal law will apply regardless of whether fish are caught in the EEZ or in state waters.	1.1) VA, MD and PRFC will implement a minimum size limit of 14" in the recreational and commercial tautog fisheries. Minimum size limits may be changed as more data becomes available on stock condition and biological reference points are re-evaluated.	1998 2003 2005 Continue	MD commercial and recreational fisheries have a 16" minimum size, 4 fish/person/day from January 1 – May 15, 2 fish/person/day from May 16 – October 31, 4 fish/person/day from November 1 – 26, and is closed from November 27 – December 31. VA has a 16" minimum size, 3 fish/person/day creel, and a recreational closure from May 1 – Sept 19. VA commercial fishery has a 15" minimum size, no catch limit, and seasonal closures from January 22 – last day of February and May 1 - October 31. PRFC has a 14" minimum size limit and no harvest restrictions for both commercial and recreational fisheries.
	1.2) VA, MD and PRFC will reduce fishing mortality to interim and target rates, as defined by ASMFC, through a combination of possession limits, gear, seasons, and/or other restrictions. Target rates may be changed and management measures adjusted as more data becomes available to manage the stock. Due to differences in F between MD and VA, different management strategies may be necessary to reach the target F set by ASFMC. The jurisdictions will continue to work towards a unified, Baywide management strategy.	1998 2000 2003 2005 2011 2011 2012 Continue	A benchmark coastal stock assessment was completed in 2005 (using data from 1981-2004). Results indicate that F declined from 0.71 to 0.299. Overfishing was redefined as $F_{40\%SSB}=0.29$. The most recent 3-year average ($F=0.389$) exceed the ASMFC rebuilding target ($F=0.2$), so tautog are being overfished. Tautog have a SSB_{2009} of 23.5 million lbs, 20.8 million lbs below the $SSB_{threshold}$ meaning tautog are currently overfished. ASMFC Addendum VI was implemented to reduce F to 0.15, a 53% reduction, and prohibit possession of tautog caught in federal waters. MD's 2012 harvest reduction was decreased from 48% to 39%. Based on the 2015 tautog benchmark stock assessment, the stock is overfished and overfishing is occurring. ¹ Besides assessing tautog as one unit stock along the coast, a regional stock assessment approach was evaluated. As a result, ASMFC has initiated the development of an amendment for the proposed regional approach with region-specific reference points and scheduled for completion in 2016.
	1.3) VA and MD waters will continue to require degradable fasteners in tautog pots and traps utilizing either: <ul style="list-style-type: none"> • Untreated hemp, jute, or cotton string of 3/16" (0.48 mm) or smaller • Magnesium alloy, timed float releases (pop-up devices) or similar magnesium alloy fasteners • Ungalvanized or uncoated iron wire of 0.09" 	1997 Continue	A pot and trap shall have hinges on one panel/door made of untreated hemp or jute string 3/16" (4.8 mm) diameter or smaller, magnesium alloy fasteners or ungalvanized/uncoated iron wire of 0.094" (2.39 mm) diameter.

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	(2.39 mm) or smaller.		
2.1) VA and MD will work with Virginia Institute of Marine Science, Old Dominion University, University of Maryland, Smithsonian Institute and National Marine Fisheries Service's Marine Recreational Fisheries Statistics Survey to conduct research into the size, age and sex composition of tautog in the Chesapeake Bay. The agencies' stock assessment departments will continue to collect information on size composition to monitor the status of tautog stocks. This stock assessment data will be used to determine a baseline of age and sex distribution for the local stock, significant deviation from which will be used as a trigger mechanism to determine the need for future management measures.	2.1) The management agencies will gather data on age, size and sex distribution to be used as a baseline measurement of a healthy population and will encourage research into the possibility of sex-reversal in the tautog population.	Continue 1989-1999 Continue 2014	Annual fecundity estimates are much higher than previously thought. All states are required to collect data to support the coastwide stock assessment. Data are collected from cooperating head boat captains, trawl, and seine. A DNA analysis of tautog is underway to determine if there is genetic separation in the coastal stock. Maryland is participating in this study.
	2.1 A) VA will continue the Baywide trawl survey of estuarine finfish species and crabs to measure size, age, sex, distribution, abundance and CPUE.	Continue	Data from the Baywide trawl survey is used in the ASMFC stock assessment. However, very little data is collected on tautog.
	2.1 B) VA implemented a mandatory reporting system for commercial licensees beginning January 1, 1993. Maryland's mandatory reporting system has been in effect since 1944 (excluding eel). Improved reporting of commercial landings, along with more detailed information on catch location and effort are some of the expected benefits of these programs.	Continue	Commercial reporting has been improved through more stringent penalties for late reporting and no reporting. MD commercial landings have been <1% of the coastal harvest since 2007.
	2.1 C) VA will continue to supplement the Marine Recreational Fisheries Statistics Survey to obtain more detailed catch statistics at the state level. VA's new recreational saltwater fishing license may provide funding for more extensive surveys of the state's recreational fishery.	2009 Continue 2011 Continue 2011 On-going	MD contracted to have supplemental MRFSS recreational data collected. MD implemented a coastal recreational saltwater license requirement. The MRFSS survey is being improved through implementation of the MRIP program. NMFS requires all states to register recreational fishermen to create a more robust data base to estimate recreational harvest. Estimated total recreational catch was 2,545 fish (2014) and 15,970 fish (preliminary 2015).
	2.1 D) MD's Coastal Bays Fisheries Investigation will be expanded by conducting a creel survey from recreational headboats. The survey will collect biological data on tautog such as sex, length, age and information on recreational fishing effort.	1972 Continue 1999 Continue	Juvenile tautog are sampled during the summer and fall coastal bays trawl and seine survey (not designed to target tautog). MD Coastal Bays Fisheries Investigation annually collects age, length, and sex data plus tissue samples for DNA analysis. Tautog are purchased from several commercial fishermen or collected by hook and line.
2.2) The jurisdictions will promote research to determine the extent of migration and mortality	2.2) Research on migration of tautog between areas is encouraged. Tagging experiments to provide data	Continue	A study on the seasonal occurrence of tautog in the lower CB indicates that most fish tagged and released in inshore

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in localized tautog populations. As reliance of this species on structure for both food and shelter may limit populations in the Chesapeake Bay area, studies designed to determine the relationship between population size and available shelter and food sources should likewise be encourages.	on tautog migration may be funded from sales of saltwater fishing licenses. The Virginia Game Fish Tagging Program will be continued.	2007 On-going Continue	waters remain inshore for the winter rather than move offshore (Arendt, Lucy and Munroe, 2001). VA initiated Marine Sportfish Collection Project to collect sex, length, and age data. Freezers were set up for recreational anglers to donate whole fish or carcasses. VA initiated Saltwater Fisherman's Journal where anglers log their fishing experiences and anecdotal information.
3.1.1) Restoration of aquatic reefs could lead to increased habitat for tautog. Jurisdictions will continue to expand and improve their current oyster restoration programs with periodic program evaluations to ensure maximum success.	3.1.1A) MD and VA will continue the implementation of the 1994 Oyster FMP which combines the recommendations of both the Virginia Holton Plan and the Maryland Roundtable Action Plan. Strategies in both VA & MD have taken a new focus as the programs intensify efforts to manage around the devastating oyster diseases, Dermo and MSX, currently infecting Chesapeake Bay oysters.	Continue 2003 2004 2008 2009 - 2010 2012 Continue	The 1994 Oyster FMP was revised and adopted in 2004. It incorporated concepts from the 1994 FMP and the Aquatic Reef Habitat Plan. Sanctuary and special management areas are protected from harvest and oyster habitat is being restored. <i>Crassostrea virginica</i> (native oyster) and not <i>Crassostrea ariakensis</i> (Asian oyster) will be used for reef development following the Environmental Impact Statement for Oyster Restoration in Chesapeake Bay Including the Use of a Native and/or Nonnative Oyster. MDNR has expanded the oyster sanctuary network from 9% to 25% (app. 9,000 acres) of the available oyster habitat. Both recreational and commercial fish species will benefit from improved/protected oyster bar habitat. Oyster aquaculture is increasing. 1,483 acres of aquaculture have been permitted since 2011. Several thousand acres are in application review.
	3.1.1B) MD and VA will continue the implementation of the Aquatic Reef Habitat Plan. "The purpose of the Aquatic Reef Habitat Plan is to guide the development and implementation of a regional program to rebuild and restore reefs as habitat for oysters and other ecologically valuable aquatic species."	2007 Continue Continue 2010 On-going	MD ARC, MARI, and Maryland's Artificial Reef Management Plan were created and several reefs have been built in the Bay. Reefs are qualitatively monitored with underwater video. There is no set sampling schedule or protocol. ARC and MARI have begun support for shallow water (<20 ft.) reef projects.
	3.1.2) The creation of new artificial reefs and the expansion and improvement of preexisting reefs will provide additional habitat for the tautog population.	3.1.2A) Jurisdictions will continue to maintain, expand, and improve their artificial reef programs. Since 1995, VA has developed 3 new reef sites within the Bay and expanded several existing sites,	1996-2006 MD terminated its program in 1996. Artificial reef development was administered in the Chesapeake Bay by MD Environmental Service and in the Atlantic Ocean by the Ocean City Reef Foundation (OCRF).

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	deploying more than 6,000 designed structures (concrete tetrahedrons) and over 5,000 tons of concrete rubble. MD has designated 3 sites as oyster sanctuaries where harvest is not allowed: Plum Point, lower Severn River and Cambridge. MD will also be examining the efficacy of small hill sanctuaries at 3 sites: Tangier, Choptank and Strong Bay (Chester R.).	2007 On-going	MD Artificial Reef Committee and the MD Artificial Reef Initiative (MARI) were established to develop reefs in cooperation with OCRF. Both MARI and OCRF accept private donations while MD contributes funds when available for reef development projects.
		Continue	In VA, artificial reefs are being funded through Recreational Advisory Board. All artificial reefs are created with funds from recreational license revenues adhere to gear type prohibitions.
		2008	44 NY subway cars were deployed off Ocean City.
		2011	USN Destroyer <i>Radford</i> was reefed on August 10, 2011. The vessel has since broken into 3 pieces but remains upright.
		On-going	MARI and OCRC continue to develop existing and new artificial reefs as funding and materials become available. For the most up-to-date information on the MD artificial reef program go to http://www.dnr.maryland.gov/fisheries/reefs/ and for the VA artificial reef program go to http://mrc.virginia.gov/vsrfd/reef.shtm
	3.1.2B) VA has recently prohibited the use of all gear except recreational rod and reel, hand-line, spear, or gig on four artificial reefs in state waters. The result of this regulation is similar to the MAFMC/ASMFC Special Management Zones that protect vital tautog habitat.	Continue	MD and VA both adopted legislation that prohibits hydraulic clamming (and crab dredging in VA) in or near SAV beds. MD has a prohibition on hydraulic dredging in coastal bays. It is allowed in MD Chesapeake Bay waters, but not within a delineated SAV bed. There is no required setback from the bed.
3.2.1) Jurisdictions will continue efforts to: “achieve a net gain in SAV distribution, abundance, and species diversity in the Chesapeake Bay and its tributaries over current populations”.	3.2.1.1A) Protect existing SAV beds from further losses due to increased degradation of water quality, physical damage to the plants, or disruption to the local sedimentary environment as recommended by the Chesapeake Bay Submerged Aquatic Vegetation Policy Implementation Plan.	Continue	MD and VA prohibit hydraulic clamming and crab dredging (VA) in or near SAV beds. MD prohibits hydraulic dredging within delineated SAV beds, but there is no required setback.
	3.2.1.1B) The Guidance for Protecting Submerged Aquatic Vegetation in Chesapeake Bay from Physical Disruption was developed in response to the above action and should be used by agencies making	Continue	MD implemented a living shorelines program in 1970 to encourage vegetative shoreline stabilization. Regulations are in place to prohibit dredging through

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	decisions that influence SAV survival in Chesapeake Bay. The following recommendations from the guidance document should be strongly considered when making decisions that impact SAV, with special emphasis on SAV that falls within the salinity range of juvenile. 1. Protect SAV and potential SAV habitat from physical disruption. Implement a tiered approach to SAV protection, giving highest priority to protecting Tier I and Tier II areas but also protecting Tier III areas from physical disruption. 2. Avoid dredging, filling or construction activities that create turbidity sufficient to impact nearby SAV beds during SAV growing season. 3. Establish an appropriate undisturbed buffer around SAV beds to minimize the direct and indirect impacts on SAV from activities that significantly increase turbidity.	2003	SAV beds. Tiered designation and prioritization of SAV beds has not been implemented. Avoidance of dredging, filling and construction impacts to SAV is strictly enforced by MDE and USACE with input from DNR, USFWS, and NMFS. MD has not established undisturbed buffers. VA has established buffer criteria. The revised SAV goal adopted by Chesapeake Bay Program was restoration of 185,000 acres of SAV by 2010 and planting 1,000 acres of SAV by 2008.
		2008	MD legislated that shoreline stabilization projects must use living shoreline techniques unless demonstrated to be infeasible.
		2012	The SAV planting goal was revised to be the planting of 20 acres per year.
		2014 Continue	A new Chesapeake Watershed Agreement was adopted in 2014. The Bay jurisdictions developed a SAV outcome (goal) and a management strategy as a framework for reaching the goal. Biennial work plans are currently under development and will include actions to reach the baywide goal of 130,000 acres by 2025.
	3.2.1.2) Set and achieve regional water and habitat quality objectives that will result in restoration of SAVs through natural revegetation as recommended by the Chesapeake Bay SAV Policy Implementation Plan.	Continue	Water quality criteria have been adopted and there is a water quality outcome in the 2014 Chesapeake Watershed Agreement. http://www.chesapeakebay.net/restoringwaterquality.aspx?menuitem=14728 .
	3.2.1.3) Set regional SAV restoration goals in terms of acreage, abundance, and species diversity considering historical distribution records and estimates of potential habitat as recommended by the Chesapeake Bay SAV Policy Implementation Plan.	2003 Continue	Chesapeake Bay Program adopted a revised the SAV goal to plant 1,000 acres of SAV by 2008; 173 acres have been planted to date (http://www.chesapeakebay.net/indicators/indicator/planting_bay_grasses). The SAV planting goal was revised in 2012 to the planting of 20 acres per year. One acre was planted during 2013. The restoration goal is 185,000 acres of SAV (see 3.2.1A). VIMS annually surveys SAV distribution in Chesapeake Bay. 2013 SAV acreage was 59.9 thousand and 2014 estimated acreage is 75,835.
3.2.2) The jurisdictions will use The Submerged Aquatic Vegetation Habitat	3.2.2) When choices must be made in selecting SAV restoration projects, to fund and support under the	Continue	More emphasis is being placed on multispecies benefits when considering restoration projects. Long-term

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Requirements and Restoration Targets: A Technical Synthesis as a guide to set quantitative levels of relevant water quality parameters necessary to support continued survival, propagation and restoration of SAV, as well as established the regional SAV restoration target goals defined earlier in this section.	Chesapeake Bay SAV Policy Implementation Plan, specific attention should be given to action items that lead to the protection and restoration of SAV found within the juvenile tautog habitat range.		survival of SAV plantings has been limited. STAC reviewed the SAV restoration projects and concluded they were operationally successful but functionally unsuccessful. SAV aerial surveys continue.
3.3) In 1998, the Chesapeake Executive Council adopted the Chesapeake Bay Wetlands Policy in recognition of the ecological and economic importance that wetlands play in the Chesapeake Bay. The Wetlands Policy establishes an immediate goal of no net loss with a long-term goal of a net resource gain for tidal and nontidal wetlands. It identifies specific actions necessary to achieve both the short term goal of the Policy, "no net loss" and the long term goal of "a net resource gain for tidal and nontidal wetlands."	3.3) The jurisdictions should strive towards achieving the following, especially in the salinity range of tautog. a) define the resource through inventory and mapping activities b) protect existing wetlands c) rehabilitate, restore and create wetlands d) improve education e) further research.	Continue 2006 Continue 2009 Continue 2011 On-going 2013/2014 On-going	Wonders of Wetlands (WOW) curriculum was developed GIS mapping activities are underway to target protection and restoration of habitat resources. Habitats are not targeted to benefit a specific species. MD is developed a Blue Infrastructure that includes mapping structural habitat and SAV. Wetland mosquito ditches from the 1930s-1940s are being modified to reduce tidal flow and restore wetland hydrology and function. Between 2010 and 2011, 3,775 acres of wetlands were established or re-established and 107,239 acres were enhanced or rehabilitated. The new Chesapeake Bay Program Watershed Agreement has a wetlands outcome to create or reestablish 85,000 acres of wetlands and enhance the function of wetlands on an additional 150,000 acres.
3.4.1) Jurisdictions will continue efforts to improve Baywide water quality through the efforts of programs established under the 1987 Chesapeake Bay Agreement. In addition, the jurisdictions will implement new strategies, based on recent program reevaluations, to strengthen deficient areas.	3.4.1A) Based on 1992 baywide nutrient reduction plan reevaluation, the jurisdictions will: a) expand program efforts to include the tributaries b) intensify efforts to control nonpoint sources of pollution from agriculture and developed areas c) improve on current point and nonpoint source control technologies.	Continue 2009 2009 2010	Maps that indicate regions of concern for living resources have been developed. See Chesapeake Bay Program website for updates on nutrient reduction. http://www.chesapeakebay.net/status_reducingpollution.aspx?menuitem=19859 . President Barack Obama's executive order recommitted federal agencies to Bay restoration and regulatory enforcement. EPA established a Bay wide TMDL (aka: pollution diet).

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		2012	Each jurisdiction must establish 2 year milestones for progress towards meeting its TMDL.
		2013	Legislation has been passed for restrictions on new developments using septic systems.
		2014 Continue	Legislation for a stormwater fee based on impervious surface coverage was enacted.
	3.4.1B) Based on the 1994 Chesapeake Bay Program Toxics Reduction Strategy Reevaluation Report, the jurisdictions will emphasize the following 4 areas: a) pollution prevention: target “regions of concern” & “areas of emphasis” b) regulatory program implementation: insure that revised strategies are consistent with and supplement pre-existing regulatory mandates c) regional focus: identify and classify regions according to the level of contaminants d) directed toxics assessment: identify areas of low level contamination, improve tracking and control nonpoint sources.	2014 Continue	2014 Chesapeake Watershed Agreement outcome is to achieve a 60% reduction of nutrient and sediment pollution. See Chesapeake Bay Program website for updates on nutrient reduction. http://www.chesapeakebay.net/status_reducingpollution.aspx?menuitem=19859 Chesapeake Bay Program is monitoring levels of mercury, PCBs, PAHs, organophosphate and organochloride pesticides. There are two outcomes for toxic contaminants in the 2014 Chesapeake Watershed Agreement: develop a research agenda and best management practices pertaining to toxics and develop a policy to reduce and prevent toxic contaminants.
	3.4.1C) The jurisdictions will continue to develop, implement, and monitor their tributary strategies designed to improve bay water quality.	Continue April 2003	Ambient water quality criteria of DO, water clarity, and chlorophyll-a have been adopted for the Chesapeake Bay.
3.4.2 The Chesapeake Bay Program partners will “Plan for and manage the adverse environmental effects of human population growth and land development in the Chesapeake Bay watershed.” In 1996, the Chesapeake Bay Program accepted the Priorities for Action for Land, Growth and Stewardship in the Chesapeake Bay Region as a framework to address land use and development pressures in the Chesapeake Bay. This approach recognizes that communities are the basic unit for addressing growth, land-use and long-term stewardship of the natural	3.4.2) Encourage efficient development patterns which reduce nutrient and sediment loads to the Chesapeake Bay and promote responsible land management practices and decisions regarding present and future development by pursuing the following: 1) Revitalize existing communities. Revitalization efforts can assist existing communities and help reduce sprawl by encouraging the use of state-of-the-art storm water management and pollution prevention strategies. 2) Encourage efficient development patterns. Ecologically sound, efficient development	Continue	See Chesapeake Bay Program website for updates on land stewardship. http://www.chesapeakebay.net/status_protectingwatersheds.aspx?menuitem=19876 MD developed curriculum “Where Do We Grow from Here?” about population growth and its impacts on the Bay. The 2014 Chesapeake Watershed Agreement includes outcomes for stewardship, environmental literacy and land conservation.

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environment. These priorities are voluntary actions which are expected to be accomplished through a variety of public and private partners, including but not limited to the Chesapeake Bay Program. Jurisdictions will forward the goals of the Priorities for Action, which encourage sustainable development patterns. Given the fact that tautog are particularly vulnerable to suspended solids which abrade epithelial tissues and to decreasing SAV and shellfish beds which serve as habitat and feeding areas, the goals of the Priorities for Action which are germane to nutrient and sediment load reduction will be promoted.	patterns encourage higher population density; compact and contiguous development. Benefits to the Bay include reduced impervious surfaces; conservation of farms, forests, and wetlands. 3) Foster resource protection and land stewardship. Cooperation and linkages among local watershed protection planning efforts should be increased to foster a regional sense of stewardship toward the bay's natural resources. The development of new policies that integrate natural and community infrastructure in public and private planning, development and protection efforts will further this goal.		

Acronyms

ARC - Artificial Reef Committee
 ASMFC – Atlantic States Marine Fisheries Commission
 CB – Chesapeake Bay
 CCA MD – Coastal Conservation Association of Maryland
 CPUE – Catch per Unit Effort
 DO – Dissolved Oxygen
 EEZ – Exclusive Economic Zone
 F – Fishing Mortality
 FMP – Fishery Management Plan
 GIS – Geographic Information System
 MAFMC – Mid-Atlantic Fishery Management Council
 MARI - Maryland Artificial Reef Initiative
 MD DNR – Maryland Department of Natural Resources
 NMFS – National Marine Fisheries Service
 OCRF - Ocean City Reef Foundation
 PAH – Polycyclic Aromatic Hydrocarbon
 PCB – Polychlorinated Biphenyl
 PRFC –Potomac River Fishery Commission
 SAV – Submerged Aquatic Vegetation
 USACE – United States Army Corps of Engineer
 USFWS – United States Fish and Wildlife Service
 USN – United States Navy
 VIMS – Virginia Institute of Marine Science